CLAIMS

1/ A vibration motor comprising at least one stationary part and one part driven to move relative to said fixed part, together with excitation means suitable for exerting forces that tend to move rigid contact sectors presented by said fixed part and/~~or~~ said moving part and to cause said rigid sectors to vibrate in vibration modes that combine tangential vibration and normal vibration, thereby driving the movement of the moving part, said motor presenting for the tangential vibration or the normal vibration a main resonant mode and at least one secondary resonant mode, wherein the secondary resonant mode is at a frequency that is substantially equal to a harmonic frequency of the main resonant mode.

2/ A motor according to claim 1, wherein the moving part is a rigid disk rotor, said motor having a stator which comprises at least one pair of stator plates, each plate having rigid petals suitable for receiving means for displacing said rigid petals tangentially and normally.

3/ A motor according to claim 1, wherein at least one element having elastic deformation properties is included in the moving part and/or the stationary part, said element being separated from the contact face of said moving part and/~~or of~~ said fixed part by a shoe-forming portion, and

wherein the part(s) in which the elastic deformation elements are included is/are dimensioned in such a manner that the frequency of the secondary tangential resonant mode which is the resonant mode in which the shoe-forming portion and the remainder of the part oscillate in phase opposition, is substantially equal to a frequency which is a harmonic frequency of the main tangential resonant mode, in which the shoe-forming portion and the remainder of the part oscillate in phase.

4/ A motor according to claim 3, wherein the frequency of the secondary tangential resonant mode is substantially equal to twice the frequency of the main tangential resonant mode.

5/ A motor according to claim 3, including an array of elastic elements interposed between the shoe-forming portion and the remainder of the stationary part and/or the moving part.

6/ A motor according to claim 3, wherein the elastic element is made of a material presenting properties of super-elasticity.

7/ A motor according to claim 1, presenting a secondary normal resonant frequency which is substantially a harmonic frequency of the main normal resonant frequency, and wherein the excitation means comprise means for generating normal vibrations at both of these two resonant frequencies.

8/ A motor according to claim 2, comprising a casing containing at least two pairs of stator plates having tangential deformation active elements, and two rotor disks which extend between the plates of respective ones of said two pairs, the normal deformation active elements extending in particular between the plates of both of the two facing pairs, spring-forming means being interposed between the pairs of plates and the casing, the motor presenting a secondary normal resonant frequency which is substantially a harmonic frequency of the main normal resonant frequency,

wherein the excitation means comprise means for generating normal vibrations at both of these two resonant frequencies and

wherein the motor includes, between the stator plates and the spring-forming means, at least one

assembly comprising a mass and an elastic deformation element, said assembly being dimensioned in such a manner that the frequency of the secondary resonant mode in which the stator plates and said mass oscillate in phase opposition, is substantially equal to an integer number of times the main resonant frequency in which the stator plates and said mass oscillate in phase, the excitation means including means for exciting normal deformation active elements at a frequency which is substantially equal to the secondary resonant frequency.

9/ A motor according to claim 8, wherein an elastic deformation element is a normal deformation active element excited at a frequency substantially equal to the secondary resonant frequency.

10/ A motor according to claim 8, wherein a normal deformation active element for the main resonant mode is excited by a signal which is the sum of a signal at the main resonant frequency plus a signal at the secondary resonant frequency.

11/ A motor according to claim 7, wherein the secondary resonant frequency is substantially equal to an odd number of times the main resonant frequency.

12/ A motor according to claim 7, wherein the secondary resonant frequency is substantially equal to three or five times the main resonant frequency.

13/ A motor according to claim 7, wherein the frequency of the secondary resonant mode is equal to an integer number of times the main resonant frequency, with accuracy of the order of $\frac{1}{2Q}$ where Q is the lower of the quality factors of the two resonances.

14/ A motor according to claim 8, including at least one assembly comprising a mass and a plurality of elastic deformation elements interposed between the stator plates and the spring-forming means, the elastic deformation elements being of stiffnesses such that said elements correspond to a plurality of harmonic resonant frequencies.

15/ A motor according to claim 3, wherein the elastic deformation element(s) is/are made of semicrystalline polymer.

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